Adobe® LiveCycle® Production Print ES

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Introduction

Companies, government agencies and other organizations face increased pressure to reach clients with personalized communications that build loyalty and strengthen relationships the pace of business accelerates. While many organizations have invested heavily in personalized document generation over the years, these are often older systems that were not designed for multichannel communications requirements. IT and print center managers must address a wide range of short and long term needs to securely deliver consistent communications across print, fax, web, email and other channels while working with older and inflexible output systems, and across multiple channels. At the same time, organizations have invested heavily in efforts to integrate backend systems and enable streamlined end to end business processes and expect print centers to support these initiatives.

Further, customers expect communications to be timely and delivered through the appropriate channels. Customer mailings often involve multiple elements produced with diverse toolsets, increasing training, support and staffing costs. Organizations also need to better integrate their high volume printing operations with backend processes, enabling participation in secure end-to-end workflows, such as loan application approvals, that include cost effective and highly relevant customer mailings. Unfortunately, document generation and print systems were never designed to address these complex, multichannel communications requirements.

This paper will provide a technical overview of how LiveCycle Production Print ES enables companies with volume printing requirements to reduce printing, handling and mailing costs, consolidate toolsets, improve responsiveness and integrate their printing operations into end-to-end systems and processes. It will also explain how LiveCycle Production Print ES complements other Adobe LiveCycle Enterprise Suite (ES) components.

Product Overview

LiveCycle Production Print ES provides data center print managers and IT professionals with a flexible, highly customizable system for meeting high volume print needs.

LiveCycle Production Print ES software is a solution component of the LiveCycle ES suite of server based tools that span electronic forms, business process management, document security, and document generation, and shares the same Adobe LiveCycle Designer ES software and XML-based template processing. Because LiveCycle Production Print ES is optimized for high volume printing environments, it differs from other Adobe LiveCycle ES solution components by providing a dedicated composition server and development environment rather than relying on J2EE, the Adobe LiveCycle ES Foundation or Workbench.

LiveCycle Enterprise Suite consists of development tools and solution components that enable enterprises to create end-to-end business processes that extend beyond the firewall to securely

and dynamically engage customers. LiveCycle Production Print ES users can leverage LiveCycle Designer ES and XML Forms Architecture (XFA) to integrate high volume printing into sophisticated applications that span processes, employees, partners and customers. LiveCycle Production Print ES extends the reach of the LiveCycle ES platform, allowing customers to standardize on an integrated design environment for all business-critical communications. Similarly, LiveCycle ES users can extend their investment into the print center, benefiting from the efficiency gains of scheduled batch processing. At the same time, directing LiveCycle ES high volume print needs to the print center helps maximize the use of expensive printer and handling equipment.

LiveCycle Production Print ES consists of the following desktop and server sub-components.

LiveCycle Designer ES: LiveCycle Production Print ES includes LiveCycle Designer ES to provide intuitive, graphical design capabilities that make it easy to design templates and deploy from a single desktop application and without deep technical knowledge. LiveCycle Designer ES provides robust layout specifications and features, allowing developers to create XML Data Package (XDP) templates with layouts that dynamically adjust when merged with XML data. This helps ensure that documents accommodate the merged data content and volume by including or excluding design elements, growing to create space for data and paginating automatically. LiveCycle Designer ES makes it easy for development teams to work collaboratively, providing intuitive tools to lay out templates and bind data to back-end systems. Designed to support complex enterprise operations, it allows developers to preview layouts electronically or generate test prints. Users of other LiveCycle ES server components also benefit from the LiveCycle ES repository, which simplifies the creation and maintenance of large collections of templates or fragments, and enables export to the LiveCycle Production Print ES environment. Fragments are reusable components such as a logo or address blocks used on multiple templates. LiveCycle Designer ES allows organizations to standardize on one document design tool for high-volume document production, interactive and on-demand needs.

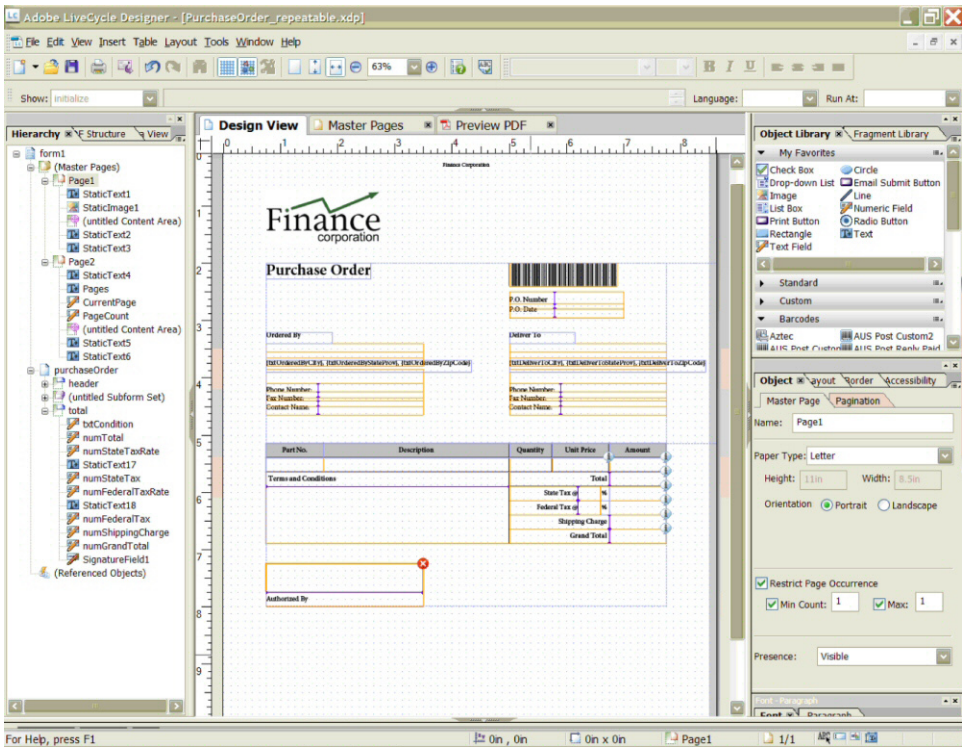

Figure 1: LiveCycle Designer ES

Central to the LiveCycle Production Print ES server components, the **Communication Server** is a high capacity, distributed and multithreaded document composition engine designed for interoperability with enterprise systems and capable of rendering thousands of page faces per minute per CPU. It provides robust capabilities to prioritize workloads and help organizations ensure reliable document delivery, including queuing, dynamic routing and load balancing, and supports a wide range of output formats and channels.

Design Center: The Design Center is the design-time interface for processes executed by the Communication Server such as input and output communications, sorting, OMR and page layout. Communication processes are shown in a logical, flow-oriented representation that reflects the flow-based sequence in which the Communication Server processes data. This includes the description of the existing system landscape, including the input and output interfaces that are to be used. In addition, settings for the input and output connectors can be maintained. Design Center enables the separation of connection settings, data mapping/layout design, and runtime configurations. This separation is the basis of the multi-user concept, which enables different users to work on different parts of a Production Print project, such as document design and OMR marking, at the same time.

Control Center: The Control Center provides an easy to use interface for deploying, monitoring and controlling print services created in Design Center. Administrators can define run-time parameters, start and stop services, assign alerts and review event logs. Projects are imported from the Design Center using self contained export files that simplify tasks such as moving, duplicating, and troubleshooting projects in single or multi-server environments. Control Center provides a graphical user interface making it easy to monitor services on several computers as well as to connect remotely to Communication Servers running on both Microsoft and UNIX platforms.

Process Flow

LiveCycle Production Print ES enables sophisticated presentment of enterprise documents, leveraging data from diverse sources and targeted to multiple outputs. The following sections discuss the main stages in the LiveCycle Production Print ES process flow, including back-end connectivity, data collection and staging, formatting, post processing, rendering, and management.

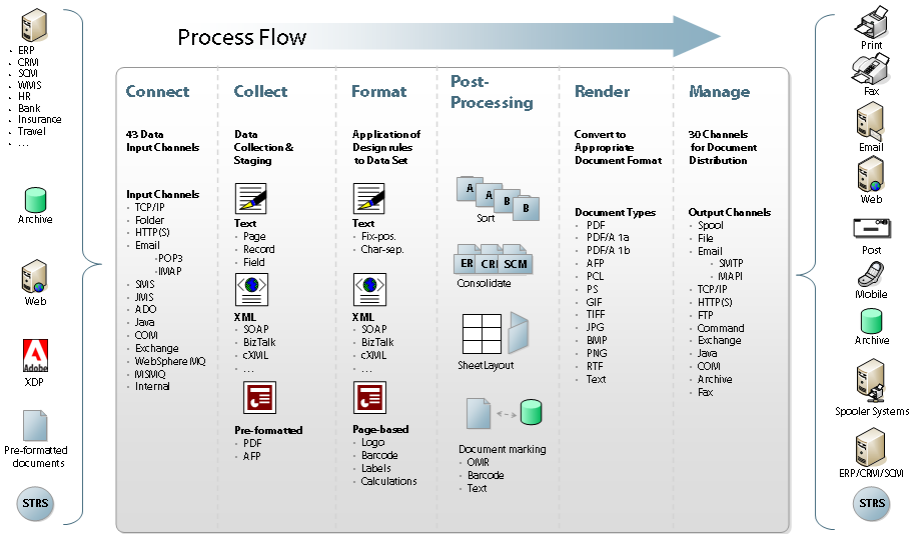

Figure 2: The LiveCycle Production Print ES process flow

Connect

LiveCycle Production Print ES embraces open standards and protocols that offer connectivity to a wide range of back end systems such as enterprise resource planning, customer relationship management, supply chain management, human resource and other core business systems. Data

can also be retrieved from archives, web servers, formatted documents such as PDF and AFP files via the PDFIN and AFPIN components respectively, and other LiveCycle Production Print ES systems to achieve distribution, scaling and load balancing. Organizations utilizing LiveCycle ES can integrate production printing with sophisticated business processes automations such as loan application processing or government program administration. LiveCycle Production Print ES supports over forty input channels for connecting to such systems, including TCP/IP, watched folders, HTTP and HTTPS, POP and IMAP-based email and Short Message Service (SMS). Organizations can also leverage current investments in Java™ development using the industry standard Java Messaging Service (JMS) API for communicating with Java-based applications in a distributed environment, or meet specialized connection requirements by writing customized connectors. IBM® WebSphere® MQ support provides reliable connectivity to distributed SOA services.

Microsoft-oriented infrastructure elements can be seamlessly accessed via Microsoft Connectivity components, including ActiveX Data Objects, COM, Microsoft Message Queuing (MSMQ).

Collect

IT and print center managers are challenged to integrate data in multiple formats such as simple text, character separated records, XML, or even preformatted PDF and AFP documents in their output. These data sources are often produced by diverse systems spanning multiple departments. LiveCycle Production Print ES supports sophisticated parsing of a wide range of structured and unstructured data sources, enabling project designers to collect and use information of interest from multiple sources in personalized print jobs. For example, a bank customer may complete and submit a credit card application PDF form online. In addition to being routed through a review and approval process orchestrated in LiveCycle ES, a final PDF of the application document can be sent to LiveCycle Production Print ES, which produces a customized acknowledgement letter based on an XDP template produced in LiveCycle Designer ES, and attaches the application PDF document. Individual documents are stored and processed overnight as a batch into an AFP print stream which will be printed and enveloped.

At project design time, developers work in the Design Center to stage projects through development, testing and production stages in a secure and permission controlled manner. When ready, projects are deployed, launched and managed via the Control Center, and begin to automatically process data as it is received on the defined input channels.

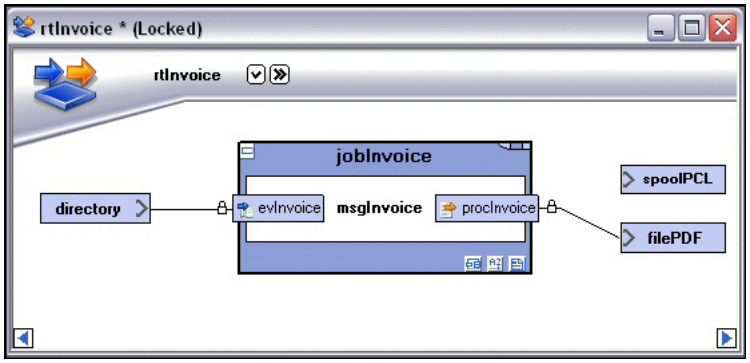

Figure 3: Defining project input and output in the Design Center

Format

LiveCycle Production Print ES parses structured data such as XML from applications in addition to field-record or page-based ASCII data from applications with less sophisticated data handling. This data is merged with LiveCycle Designer ES templates and transformed into a "logical" page in a device independent format where elements such as typefaces, line and paragraph breaks, and other similar attributes are applied. During the formatting stage, any XFA formatting attributes specified in LiveCycle Designer ES, such as common document fragments, scripting, colors, lines, shapes and others can be rendered via the XDP template, greatly improving maintainabil-

ity. XFA and LiveCycle Designer ES also support the dynamic inclusion of the full range of industry standard barcode formats during the formatting process, helping organizations maximize their investment in existing IT infrastructure by connecting paper-based processes to core systems such as content management, Enterprise Resource Management (ERP), and Customer Relationship Management (CRM).

Additional control over document processing can be gained using a simple scripting language. Similar to a simplified version of the Perl or C programming languages, scripts utilize a familiar syntax and can be run at specific times and phases during the execution of a project or triggered by events. Specific scripts can be used, for example, to determine whether input data matches a defined message, or to assign values to fields in the runtime configuration. Scripting automates a variety of tasks such as the creation of documents retrieved from multiple sources. For example, a bank may need to generate a loan agreement, standard terms and conditions sheet, and a waiver form where the terms and conditions and waiver vary by state. In this scenario scripting could be used to select the right content by state and combine the three documents into one.

LiveCycle Production Print ES also transforms pre-formatted AFP and PDF documents into the same device independent format for subsequent processing. For example, PDFs from a content management system can be repurposed as formatted content in a LiveCycle Production Print ES AFP stream.

Post Processing and Enveloping

Documents can be organized to support production printing and advanced document handling, such as document collection, document sorting, page layout and imposition with Post Processing. Metadata associated with content defines the criteria for subsequent processing such as sorting, splitting, logic for enveloping, or grouping into jobs. Processes can be fully automated, or operators can query the post processing repository for specific criteria and then initiate new jobs and release them to production. Finishing options defined in Design Center provide for the addition of text and marks required for mailroom machines such as folders, inserters, and envelopers, and are dependent upon the grouping, layout, and envelope logic previously defined in the job. Such marks include OMR (Optical Mark Recognition) codes or barcodes (e.g., 3 of 9, Datamatrix) which specify the rules for enveloping, as well as barcode and text labels to provide instructions for manual handling.

LiveCycle Production Print ES jobs can be performed synchronously or asynchronously. Simple jobs can be processed at high speed or the post-processing repository can collect multiple jobs over time and then group them for the most cost-effective and efficient delivery. Asynchronous jobs allow optimization of a wide range of tasks such as collecting documents over time and then sorting by postal codes to take advantage of bulk postage rates, collecting multiple documents for the same household or account into the same envelope, adding ad-hoc communications to regularly scheduled mailing such as invoices, centralizing content production in distributed print environments or centralizing printing in distributed content production environments. The post-processing repository helps organizations to maximize throughput, shorten delivery times and reduce costs.

- Document sorting and consolidation provide data center operators with opportunities to reduce costs while engaging their customers in better unified and customized communications. For example, an input job might contain several documents such as invoices, delivery notes, and flyers. If no sorting were applied, the documents would be processed and output in the order they were received, resulting in multiple documents per customer. Using the post processing repository, rendered, device independent documents are stored temporarily, sorted by customer and output as one combined document, lowering costs and improving customer communication.

- Sheet layouts apply physical page properties to documents in the post processing stage. For example, several pages can be imposed onto a paper roll or a large cut paper sheet (e.g., A3) and its margins adjusted to create booklets or brochures. Sheet layout also allows the developer to

define duplexing rules, pre-select paper trays, or select images to be included on a page depending on previously defined criteria.

- OMR codes are a set of strokes that can be used by a variety of document handling equipment to reduce manual steps in the preparation of documents to be mailed. For example, OMR codes are read by an enveloping machine to identify the first and last pages in a document, and define additional preprinted inserts for inclusion in an envelope.

Render

After LiveCycle Production Print ES has collected data of interest from data sources such as watched folders, web services or others, formatted the document to a device independent internal format and applied any post processing such as OMR marks, the data is rendered to its final electronic or print format. LiveCycle Production Print ES delivers a wide range of formats suitable for high-volume or departmental printers, including AFP, IJPDS, PostScript, and PCL. Organizations can also leverage standard label printers and formats including Zebra, Printronix, Intermec, and TEC. Documents can also be output to a wide range of electronic formats, supporting business needs such as generating a PDF/A copy of printed correspondence and archiving in support of regulatory requirements. Electronic formats include PDF, PDF/A, CSV, HTML, TIFF, JPEG, BMP, GIF, PNG, and RTF. Organizations needing to integrate rendered output into downstream processes can utilize XML out support as well.

The LiveCycle Production Print ES post processing repository simplifies common tasks such as reprinting all or part of a job. Since formatted documents, configuration information and security settings are all stored temporarily or permanently in the repository, administrators gain flexibility to streamline processing or to meet ad-hoc and demand-driven requirements without additional investments in development, testing and other activities. For example, a government department's service enrollment program might involve sending a welcome kit to clients that includes personalized information such as account status and local walk-in resource listings, as well as guidelines for all constituents signing up for the program. Since the guidelines are common to all clients, they would be formatted and stored in the post-processing repository once, and then combined with personalized pieces as required.

Manage

Businesses, government departments and other organizations are faced with demands to provide increasingly sophisticated, timely and cost effective communications to customers, partners and constituents. IT managers and data center print administrators must deliver communications solutions that honor the user's wishes for relevant and personalized communication delivered via the appropriate channel while often needing to work with older and less sophisticated equipment. LiveCycle Production Print ES enables sophisticated document distribution over a variety of print and electronic channels.

Documents can be spooled for printing and enveloping using a wide range of equipment or written to a file, facilitating operational requirements such as outsourcing and scheduling large batch-oriented jobs. Electronic distribution and connectivity to other systems is supported via SMTP and MAPI email, high-performance TCP/IP-based integration with Enterprise Resource Management systems, HTTP and HTTPS based communications with web servers, FTP, shell-based commands, Java, and COM. Several fax standards, including generic faxing, Zetafax, Fastfax, Faxination, RightFAX and TOPCALL.

Application Connectivity SAP allows users with SAP installations to transform, enrich, format, personalize and distribute SAP business documents based on unformatted RDI or XSF data produced by SAP solutions as well as the XFP data format generated by the SAP Interactive Forms by Adobe data interface.

The Status Messenger component allows delivery status information to be sent from an output destination back to the original application that created the document. Status Messenger supports the communication of feedback from third party applications, such as an external

output management system, back to the core business system to facilitate activities such as automated or manual diagnosis and recovery.

Reporting and Accounting

Enterprises need to monitor which business documents are communicated within an organization and to its customers and how. Comprehensive reporting is critical to allowing organizations to improve customer interactions. LiveCycle Production Print ES reporting allows companies to set benchmarks, analyze trends in their communications, and compare customer interactions between different regions, countries, business units and departments.

Organizations can monitor the types of business documents, formats, and channels used to communicate with customers and explore what-if scenarios, such as the cost savings they could expect if fifteen percent of traditional mail communications were migrated to electronic delivery.

Many organizations use departmental chargebacks to promote consistent treatment of costs. Identifying costs is cumbersome. LiveCycle Production Print ES allows enterprises to monitor and identify the usage of resources, simplifying inter-departmental billing and improving operational efficiencies.

LiveCycle ES Integration

Unlike the LiveCycle ES server environment, LiveCycle Production Print ES runs independently of JAVA EE servers and can be installed directly on a Windows, Solaris, Linux, or AIX server. LiveCycle Production Print ES does not directly utilize the LiveCycle Foundation or Workbench. Rather, it provides a dedicated high performance formatting engine that merges dynamic data with LiveCycle Designer ES XDP templates to produce personalized documents. For instance, by using the LiveCycle Production Print ES Design Center to configure a watched folder as an input source, production jobs can easily be triggered and run using XML or text data written to that location by another LiveCycle ES server or other application.

Since LiveCycle Production Print ES can be integrated with existing LiveCycle ES applications, users can leverage investments in business analysis and tuning, application development, LiveCycle Designer ES templates and current integrations with other back end systems such as databases.

For example, a financial institution may have an existing LiveCycle ES orchestration that automates the new account opening process. A user logs in to a rich Flex-based portal and uses an interactive planning tool with the online aid of a financial advisor, leveraging secure Internet connections and LiveCycle Data Services ES. This Rich Internet Application (RIA) allows the client to view dynamic charts, visualize what-if scenarios and more. After reviewing recommendations, the client applies for multiple accounts using an interactive PDF form produced by LiveCycle Forms ES that pre-fills fields with known information such as name, address and client number. Upon submitting the application, LiveCycle Forms ES auto-generates and emails a signature form utilizing digital signatures and rights management to secure the transaction. LiveCycle Barcoded Forms ES automatically scans the barcode to facilitate capture of the printed, signed and mailed form. The application is routed to qualified personnel by LiveCycle Process Management ES for approval, and the client is notified on their mobile device. This workflow is readily extended by using a watched folder and LiveCycle Production Print ES to collect and merge personalized data into a welcome kit to be sent to the customer. All such kits are stored in the post processing repository as new data is submitted throughout the day, sorted and output to the production mailing department as a single batch operation at night that improves the efficiency of LiveCycle output operations while maximizing the utilization of expensive print center equipment and avoiding ad-hoc operations.

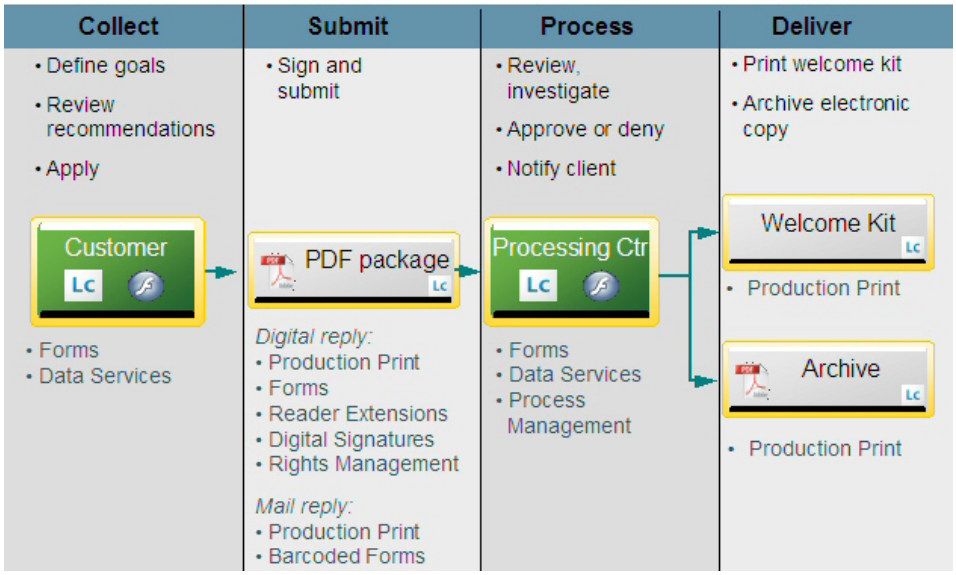

Figure 4: Example LiveCycle ES integration with LiveCycle Production Print ES

Conclusion

Organizations have invested heavily in personalized document generation for many years. Unfortunately, many organizations face challenges to work with systems that were never designed to address today's need to communicate with users across a complex matrix of multi-channel formats and distribution methods. Data centers and IT departments need to transform print centers into centralized document service hubs ready to support the growing and diverse multi-channel content needs of the enterprise. At the same time, they must control mail costs, work with aging and inflexible output systems, deliver consistent communications across multiple channels, address increasing security needs, support enterprise architecture standards and corporate initiatives to streamline end-to-end business processes.

LiveCycle Production Print ES provides all the tools needed to replace or augment aging systems and manual activities with innovative tools that streamline processes and save money. Leveraging LiveCycle Designer ES, organizations can focus on a unified environment that standardizes document layout in a single, XML-driven and data aware format, enhancing consistency across a wide range of communications. Organizations can also leverage the full suite of LiveCycle ES products to integrate production print needs with integrated electronic business process solutions.

Resources

- Learn about LiveCycle Enterprise Suite:
  http://www.adobe.com/products/livecycle/
- Learn about LiveCycle Production Print ES:
  http://www.adobe.com/products/livecycle/productionprint/
- Compare the standard and extended configurations:
  http://www.adobe.com/products/livecycle/productionprint/compare/lc_pp_es.html

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